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JUDUL: PERFORMANCE ANALYSIS OF AUDIO STREAMING OVER LOCAL AREA NETWORK (LAN)

SESI PENGAJIAN: 2005/2006

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Performance analysis of audio streaming over local area network (LAN) / Nur Farah Hanum Abdullah.

PERFORMANCE ANALYSIS OF AUDIO STREAMING OVER LOCAL AREA NETWORK (LAN)

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This report is submitted in partial fulfillment of the requirement for the Bachelor of Computer Science (Computer Network)

FACULTY OF INFORMATION AND COMMUNICATION TECHNOLOGY
KOLEJ UNIVERSITI TEKNIKAL KEBANGSAAN MALAYSIA
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I hereby declare that this project report entitled

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DEDICATION

To my beloved Parent

Whose boundles love and support replenishes and enriches my soul

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ABSTRACT

Performance Analysis of Audio Streaming over Local Area Network (LAN) is a project of analyze the performance of audio streaming software over the network. This project will give so many benefits to user that want to enable audio streaming services at their network. To test the performance of audio streaming software, student needs to use several analyzer tools such as Distinct Network Monitor and Ethereal. This tool will be used to test the ability of audio streaming software especially from their aspects of protocol issue, bandwidth and total byte. Some of the objectives of this project are such as to configure, implement, testing and analyze factors that can influence the performance of audio streaming software. Besides that, the scopes of the system are the analysis will be done for 3 main aspects which are protocol issue, total byte and bandwidth. Then, this project also will cover 2 types of networks which are LAN and ad hoc wireless network. The project methodology is using Cross Life Cycle Activities method. The audio streaming software requirements for the project are Windows Media Service and Shoutcast. Besides, the analyzer tools are such as Ethereal and Distinct Network Monitor. This project must be carry on because it will give so many benefits especially for intranet users in the future.

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ABSTRAK

Persembahan analisis penghantaran audio melalui rangkaian setempat adalah projek untuk menganalisa persembahan perisian penghantaran audio melalui rangkaian. Projek ini akan memberi banyak faedah kepada pengguna yang mahu menggunakan perkhidmatan penghantaran audio dalam rangkaian mereka. Untuk menguji persembahan perisian penghantaran audio, pelajar perlu menggunakan beberapa alat menganalisis seperti Distinct Network Monitor dan Ethereal. Alat-alat ini akan digunakan untuk menguji kebolehan perisian penghantaran audio terutama dari aspek isu-isu protokol, jalur lebar dan jumlah bit. Antara objektif-objektif projek adalah seperti untuk konfigurasi, implementasi, pengujian, dan analisis faktor-faktor yang boleh mempengaruhi persembahan perisian penghantaran audio. Selain itu, skop bagi projek ini ialah analisis akan dilakukan untuk 3 aspek utama iaitu isu-isu protokol, jalur lebar dan jumlah bit akan melitupi 2 jenis rangkaian iaitu rangkaian setempat dan rangkaian tanpa wayar *ad hoc*. Projek ini menggunakan methodologi *Cross Life Cycle Activities*. Keperluan perisian bagi projek ini ialah seperti *Windows Media Service* dan Shoutcast. Selain itu, alat-alat menganalisis adalah seperti *Ethereal* dan Distinct Network Monitor. Projek ini mesti diteruskan kerana ianya akan memberi begitu banyak kebaikan terutamanya kepada pengguna rangkaian dalaman pada masa hadapan.

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CHAPTER I

INTRODUCTION

Nowdays, streaming content over the network is gaining momentum in the communications, entertainment, music and interactive game industries. These applications are far more demanding in terms of bandwidth, latency and reliability than traditional data applications. In addition, they would require multicast support.

There are two ways to deliver audio over the network: downloads or streaming media. In downloads, an audio file is stored on the user's computer. Compressed formats like MP3 are the most popular form of audio downloads, but any type of audio file can be used. Streaming audio is not stored, but only played. It is a continuous broadcast that works through three software packages: the encoder, the server and the player. The encoder converts audio content into a streaming format, the server makes it available over the network and the player retrieves the content. Since that requires a large amount of computing resources, the streaming server must be a dedicated server.

1.1 Project Background

This project is about performance analysis of audio streaming software using analyzer tool. The performance of audio streaming will be tested and implemented on network environment. There are 2 types of networks that are using to test these audio streaming performances which are Local Area Network (LAN) and ad hoc wireless network.

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Firstly, there are so many audio streaming software or provider at the market whereas for audio, video whether it shareware or freeware but this project will be focused on three audio streaming providers. The providers are Windows Media Server and Shoutcast Server.

To test the performance of audio streaming software, student needs to use several analyzer tools such as Distinct Network Monitor, Ultra Net Sniffer and Ethereal. This tool will be used to test the ability of audio streaming software especially from their aspects of bandwidth, protocol issue and so on.

Then, this project will focus on to study the streaming architecture. This is because it easier to analyze audio streaming software performance if we know detail how the streaming works.

Overall, this project will describe from the very beginning of to study the audio streaming architecture until to analyze the performance over network.

1.2 Problem Statement

Problem statements are the main factors why this project is carries out. The problems can be caused by several factors and this project is going to overcome all that problems. There are so many problems, but this project will only concentrate to several problems. The first problems are before students can enable audio streaming at their network, student needs to know clearly about how to configure audio streaming provider both at server and client. Secondly, students need to know how they are going to implement audio streaming software over LAN and ad-hoc wireless network because the different network architecture may need the different technique. Then, students do not know the performance of audio streaming software such as the bandwidth, delay and file format that allowed. Finally, students not concern about the factors that can influence the performance and how much their effect toward audio streaming quality. So, all the problems statement above will be solved by the project objective at the next part.

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1.3 Objective

There are several objectives that will be achieved throughout this project which are:

1. To configure audio streaming at server side and client side.
2. To implement audio streaming software over LAN and ad-hoc wireless network.
3. To test performance of audio streaming software from the aspects of protocol issue, bandwidth and total byte.
4. To analyze factors that can influence the performance of audio streaming software.

1.4 Scopes

The scopes of this project will cover items below:

1. The analysis of audio streaming performance will be done through several aspects which are streaming bandwidth, protocol issue, and total byte.
2. This project will cover on how the audio streaming performance over the 2 types of networks which are wired LAN and ad hoc wireless network.
3. This project will also cover on demand and real time streaming.

1.5 Project Significance

This project is about to analyze the audio streaming performance over the 2 types of networks which are LAN and ad hoc wireless. So, this project can give so many benefits to the users who want to implement audio streaming over their network. This is because they can get the high quality audio streaming if they are using the best audio streaming software within the suitable network architecture.

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This project is important because there are so many audio streaming software in the market that we not sure about their performance or ability. Firstly, the project will study about the architecture of audio streaming where we will more understand how audio streaming works. From their architecture, it easy to know how audio streaming software meets the requirements that needed.

Then, this project will study the performance of audio streaming software. The project also will study several analyzer tools that will function to analyze the audio streaming performance. Within with this tool, the project will also discuss the main factors that influence the audio streaming performance such as bandwidth require, protocol issues and so on.

So, this project will ensure the audio streaming software that meets all the specification that needed. That all the reason what this project must be carry on because it will give so many benefits for intranet users in the future.

1.6 Conclusion

The main purpose of this project is performance analysis of audio streaming software whereas the implementation and testing will be done on network environment. This project also will focus on to study the architecture, software and performance of audio streaming.

The audio streaming software will be implemented and tested through 2 types of networks which are LAN and ad hoc wireless. There are several problem statements that cause why this project must be done and how this project can solve those problems. Besides, there are a few objectives that will be achieved throughout this project.

The scopes of this project are the things about audio streaming that this project will cover such as project limitation and project environment. In the contribution phase, the project will discuss about the project benefit and why this project is important.

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As the conclusion, this project will give so many benefits especially for intranet users and also important in audio streaming industry. For the next chapter, we will discuss about the literature review and project methodology. The literature review will cover the related technology to implement this project while the project methodology is focus on the way and technique to achieve predetermined objectives

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CHAPTER II

LITERATURE REVIEW AND PROJECT METHODOLOGY

2.1 Introduction

Streaming media is media that is consumed as read, heard and viewed while it is being delivered. Streaming is more a property of the delivery system than the media itself. The distinction is usually applied to media that are distributed over computer networks; most other delivery systems are either inherently streaming such as radio, television or inherently non-streaming for example books, video cassettes, and audio CDs.

Audio streaming enables clients to select and receive audio content from servers across the network and to begin hearing and seeing the content as soon as the first few bytes of the stream arrive at the client. Streaming technology involves audio and video compression, schemes for stream formatting and transmission packetization, networking protocols and routing, client designs for displaying and synchronizing different media streams, and server designs for content storage and delivery.

This chapter will explain the methodology using for this project, focusing on the components that make up a solution and project milestones to measure the time frame taken for its analysis, design, testing and implementation.

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2.2 Fact and Finding

In this part, this project will explain about the detail of audio streaming from the various aspects. All the information will be collected from the related thesis, journal, book and also website from the internet. This is important to get as much as information before the project can continue to the next part.

2.2.1 Theory of Audio Streaming

According to Wikipedia, the free encyclopedia, streaming media is media that is consumed as read, heard and viewed while it is being delivered. Streaming is more a property of the delivery system than the media itself. Today's streaming arena contains many diverse applications and implementations of streaming technologies.

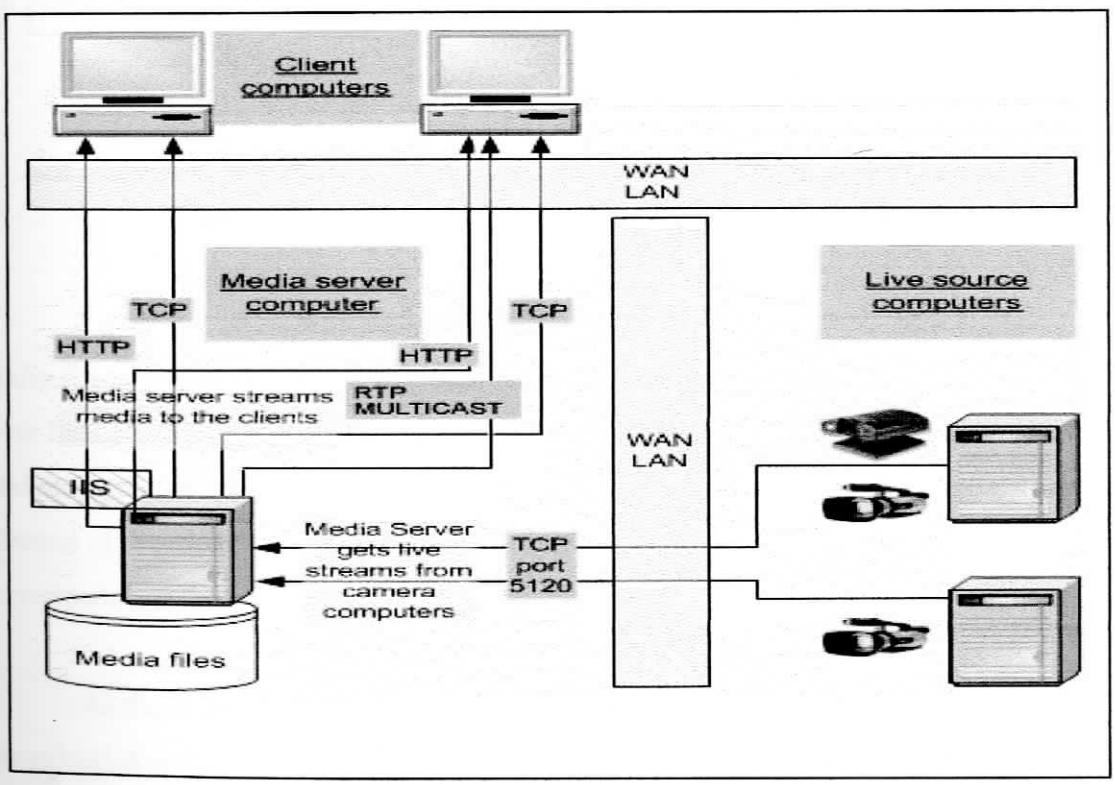

Figure 2.1: Audio Streaming Architecture over Network

Figure 2-1 shows audio streaming architecture was also designed to works over Local Area Network (LAN) beside the Internet. According to Unreal Media

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